

NUCLEOTIDE COMPOSITION OF NUCLEIC ACIDS OF THE TRACHOMA PATHOGEN
(STRAIN A₁B₁)

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NUCLEOTIDE COMPOSITION OF NUCLEIC ACIDS OF THE TRACHOMA PATHOGEN
(STRAIN A₁B₁)

[Following is the translation of an article by S. R. Beskina, N. A. Ugoleva, and A. A. Shatkin, Institute of Virology imeni D. I. Ivanovskogo, USSR Academy of Medical Sciences, MOSCOW, Published in the Russian-language periodical Voprosy meditskiny khimii (Problems of Medical Chemistry) No. 3, 1965, pages 96--97, Vol XI. It was submitted on 10 Nov 1964. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

The determination of the nucleic acids of the causative agents of a group of atypical viruses of psittacosis-lymphogranuloma venereum--trachoma (PLT) has an important taxonomic significance. With the help of histochemical methods of investigation we were able to detect the presence of DNA and RNA in the various phases of development of the trachoma causative agent [1]. By using biochemical methods, Tamura and Higashi [2] detected the presence of DNA and RNA in elementary bodies of one of the representatives of the PLT group -- the agent of meningopneumonitis.

There was interest primarily in clearing up which of the nucleic acids contain mature particles of the trachoma causative agent -- elementary bodies, and secondly in studying the nucleotide composition of these nucleic acids.

As the virus-containing material we used a 20% suspension from the membranes of yolk sacs from chick embryos, infected with the trachoma causative agent (strain A₁B₁), prepared in an 0.1 M phosphate buffer, pH 7.2. The titer of the causative agent was 10^{-7} -- $10^{-7.5}$ ELD₅₀/ml. Purification and concentration of the causative agent being studied was carried out by means of differential centrifugation at 500 and 43,000 g, and treatment with trypsin and nucleases. For adsorption of cellular detritus we used ekteolatsellyuloz. For a control of the degree of purity a suspension of normal membranes of yolk sacs was used which was treated in an analogous manner.

A control of the suspension, carried out with the help of electron and luminescent microscopes, made it possible to note that the main mass of the suspension contained elementary bodies -- $3.0 \cdot 10^{10}$ -- $6.4 \cdot 10^{10}$ particles/ml. DNA and RNA were detected in the virus containing preparations studied, but in the control material, which was subjected to analogous treatment, nucleic acids were not exposed.

The nucleotide composition of nucleic acids was determined without their preliminary isolation [3]. The separation of the nucleic acids was performed according to the method of Schmidt and Thannhauser [4]. Chromatographic separation of the mononucleotides of RNA was conducted in the solvent proposed by Magasanik [5] and Wyatt [6], and DNA -- in the solvent proposed by Kirby [7], with the help of ascending chromatography with a subsequent spectrophotometry of the eluates on the SF-4 spectrophotometer against the corresponding eluates of control sections.

The amount of micromoles of components of RNA and DNA was calculated with the help of the coefficients cited in the works by Elson, Gustafson, and Chargaff [8], and A. S. Spirin and A. N. Belozerskiy [9].

For a comparison of the composition of the nucleic acids of the trachoma causative agent and the nucleic acids of the cells of the hosts, we studied the nucleotide composition of the nucleic acids of a normal membrane of the yolk sac of chick embryos.

From the data which is presented in the table it follows that the nucleotide composition of the DNA of elementary bodies and normal tissue do not differ either in the quantitative content of individual mononucleotides, or in the index of specificity. Nevertheless, these data do not exclude the possibility of a specificity of the DNA of elementary bodies, conditioned by a different sequence in its molecules. The DNA of elementary bodies and normal tissue are regarded as the AT type.

As is apparent from the data of the table, the nucleotide composition of the RNA of elementary bodies differs from the nucleotide composition of the RNA of normal tissue based on the quantitative content of individual mononucleotides. These differences are expressed in an increase in the amount of adenine and a decrease in the amount of cytosine in the RNA of elementary bodies. There are also differences in the indices of specificity of the RNA being studied. The RNA of elementary bodies and the RNA of normal tissue are regarded in the same GC type.

In this manner, for the first time the presence has been shown of two nucleic acids - DNA and RNA - in the composition of elementary bodies of the trachoma causative agent, and their nucleotide composition has been studied.

Literature

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Material	Content of nucleotides (in %)						Purine	G + C	G + T
	G		A		C	T	Pyrimidine	A + T	A + C
	DNA								
Elementary bodies of the trachoma causative agent Normal membrane yolk sac	22.7	1.3	27.7	1.5	22.2	0.3	27.4	1.4	1.03
	2.1	0.5	20.4	1.6	22.2	0.4	27.3	0.5	0.98
	RNA								
	25.7	0.4	27.1	0.5	27.2	0.4	20.0	0.0	1.11
Elementary bodies of the trachoma causative agent Normal membrane yolk sac	25.4	0.4	28.7	0.3	24.3	0.9	20.7	0.0	1.01

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